Forum for Electromagnetic Research Methods and Application Technologies (FERMAT)

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Compact Line Source for Low Profile Continuous Transverse Stub(CTS) Array

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Abstract and Key words

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Abstract: **A compact line source consisting of a flat lens is proposed in this paper. The flat lens is used to transform cylindrical wavefront generated by the horn to a planar wavefront which provides a uniform phase distribution at the output aperture. Unlike the conventional convex lens whose design is based on Geometrical Optics (GO), the flat lens is designed based on the Field Transformation (FT) method. By optimizing the permittivity of the center layer and two matching layers, the phase compensation for wavefront transformation is achieved together with a good impedance matching over a wide band. A Continuous Transverse Stub (CTS) antenna with a low profile is designed using the proposed line source.**

Keywords—Continuous Transverse Stub (CTS) array; line source; flat lens

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Back Ground

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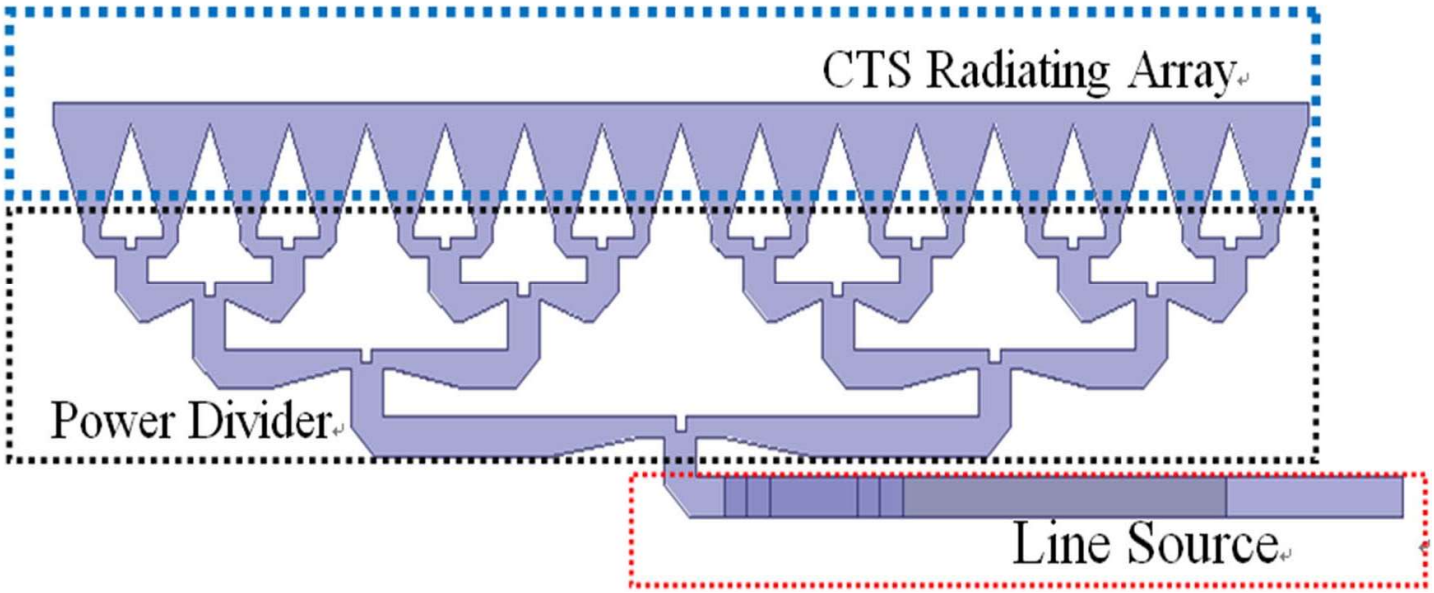
Schematics of low profile CTS antenna



Compact Line is required

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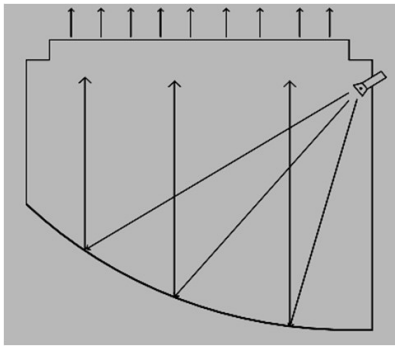
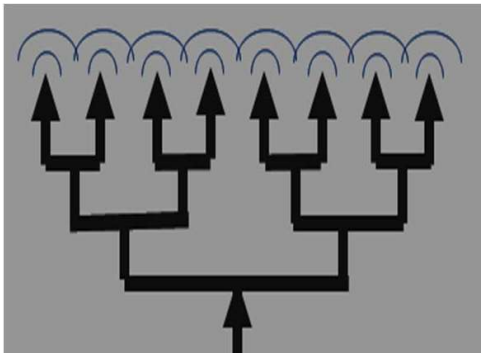
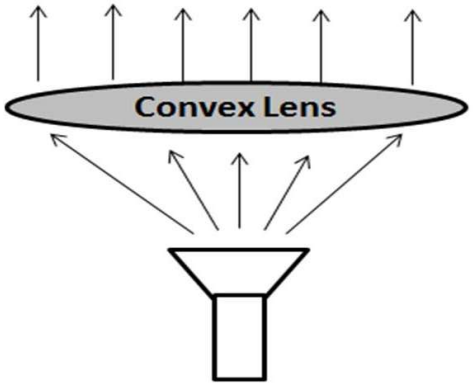


The **bulk** line source based on horn and reflector



The **costly** line source based on power divider and radiators



Compact

Line source based on horn feed and lens

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The proposed Compact Line Source

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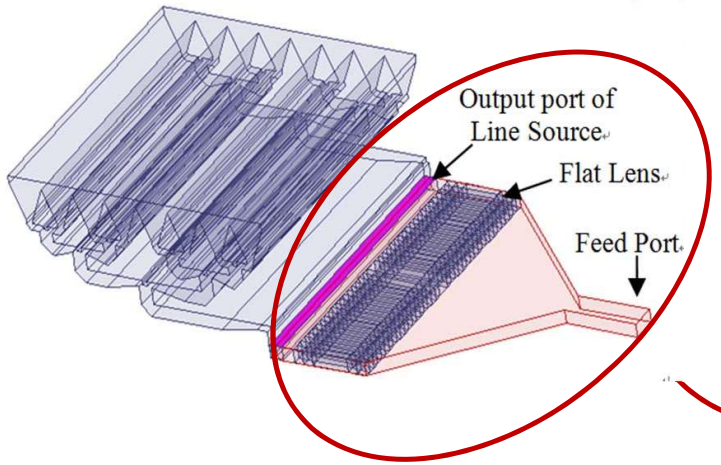
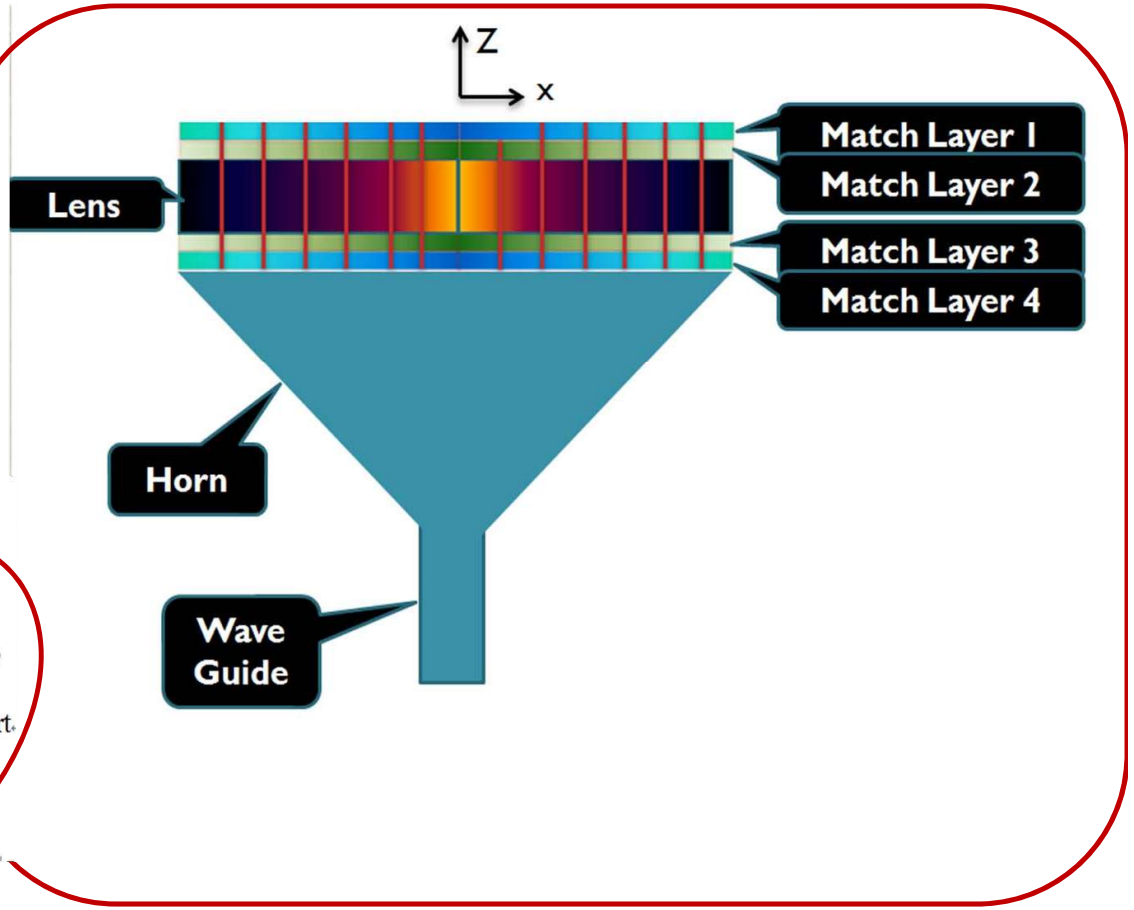
The line source and its location in CTS antenna





The Performance of the Compact Line Source

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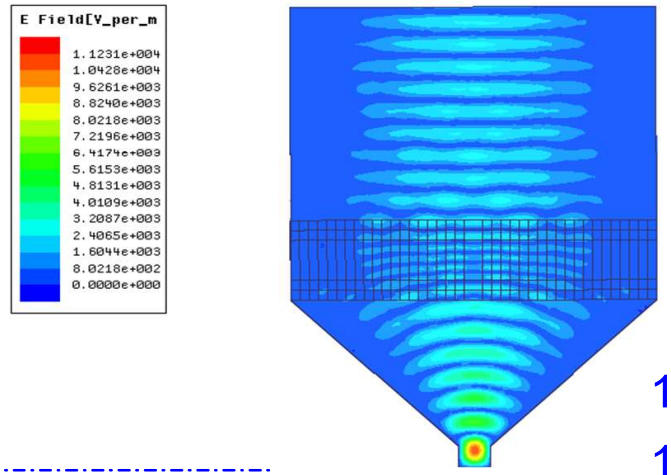

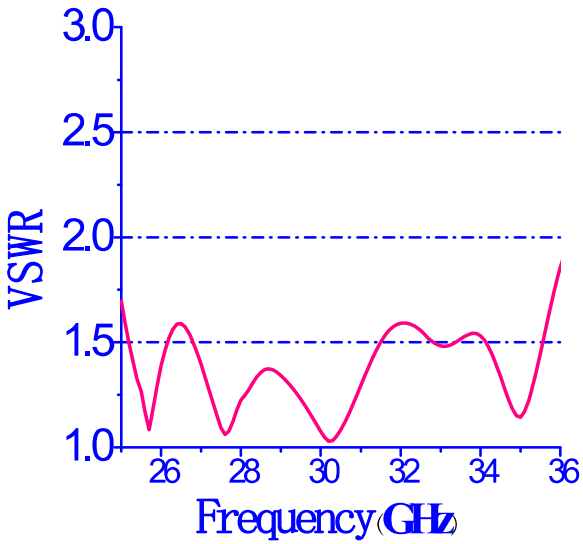

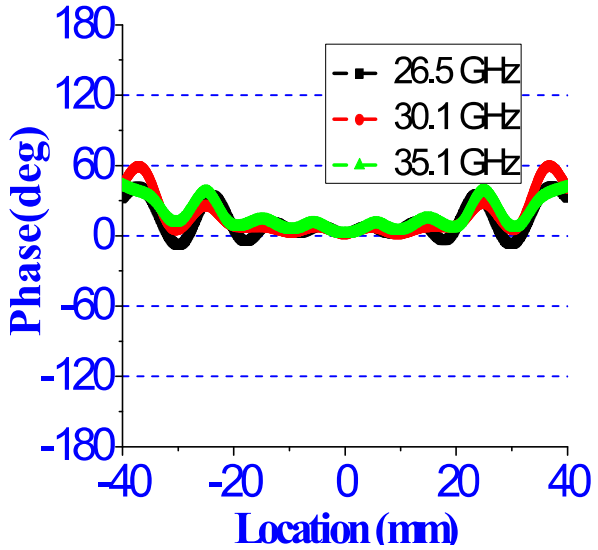

The Performance of the Line Source and CTS Element

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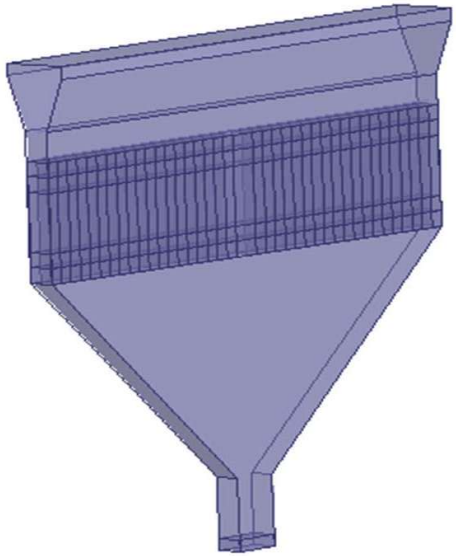

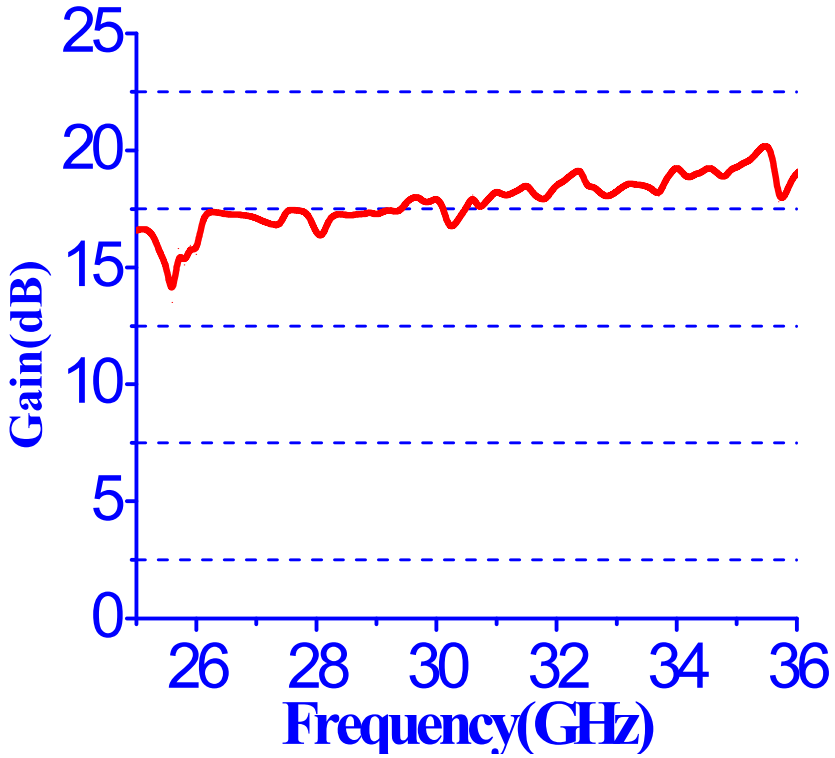

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Biography

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ZHANG Pengfei was born in 1979 in Shanxi China. He received B.S. degree, M.S. degree, and Ph.D. degree in Electromagnetic field and Microwave Technology from Xidian University, in 2001, 2006, and 2008, respectively. In 2007, he joined the National Laboratory of Science and Technology on Antennas and Microwaves, and worked as an associate professor in this lab from 2009. This work was carried out when Penfei Zhang was at the University of Central Florida as a Chinese Scholarship Council (CSC) Scholar on leave from National Key Laboratory of antenna and Microwave Technology. His research and development interests include the design of lens antenna, prediction and control of Radar cross section (RCS), the design of water antennas, electromagnetic analysis and electromagnetic calculation. He is the author of over 20 referred journal and conference papers on these topics.